



# Rise of pay for performance: implications for care of people with chronic kidney disease

## Citation

Desai, Amar A., Alan M. Garber, and Glenn M. Chertow. 2007. Rise of pay for performance: implications for care of people with chronic kidney disease. *Clinical Journal of the American Society of Nephrology* 2, 5:1087-1095.

## Published Version

doi:10.2215/CJN.00510107;http://cjasn.asnjournals.org/content/2/5/1087

## Permanent link

<http://nrs.harvard.edu/urn-3:HUL.InstRepos:11576729>

## Terms of Use

This article was downloaded from Harvard University's DASH repository, and is made available under the terms and conditions applicable to Other Posted Material, as set forth at <http://nrs.harvard.edu/urn-3:HUL.InstRepos:dash.current.terms-of-use#LAA>

## Share Your Story

The Harvard community has made this article openly available.  
Please share how this access benefits you. [Submit a story](#).

[Accessibility](#)

# Rise of Pay for Performance: Implications for Care of People with Chronic Kidney Disease

Amar A. Desai,<sup>\*†</sup> Alan M. Garber,<sup>\*§</sup> and Glenn M. Chertow<sup>†‡</sup>

*\*Center for Health Policy and Primary Care and Outcomes Research, Stanford University, Stanford, <sup>†</sup>Departments of Medicine and <sup>‡</sup>Epidemiology and Biostatistics, University of California San Francisco, San Francisco, and <sup>§</sup>Veterans Affairs Palo Alto Health Care System, Palo Alto, California*

Many health care providers and policy makers believe that health care financing systems fail to reward high-quality care. In recent years, federal and private payers have begun to promote pay for performance, or value-based purchasing, initiatives to raise the quality of care. This report describes conceptual issues in the design and implementation of pay for performance for chronic kidney disease and ESRD care. It also considers the implications of recent ESRD payment policy changes on the broader goals of pay for performance. Congressionally mandated bundle payment demonstration for dialysis, newly implemented case-mix adjustment of the composite rate, and G codes for the monthly capitation payment are important opportunities to understand facility and provider behavior with particular attention to patient selection and treatment practices. Well-designed payment systems will reward quality care for patients while maintaining appropriate accountability and fairness for health care providers.

*Clin J Am Soc Nephrol* 2: 1087-1095, 2007. doi: 10.2215/CJN.00510107

Health care financing systems, which were created to ensure payment for services, traditionally lacked incentives to improve the quality of care. In a landmark report, the Institute of Medicine encouraged private and public purchasers of care to “examine their current payment methods to remove barriers that impede quality improvement and to build stronger incentives for quality enhancement” (1). The Medicare Payment Advisory Commission (MedPAC) has recommended that Medicare revise its payment methods to include financial incentives for quality improvement (2). In testimony to Congress, MedPAC Executive Director Mark Miller stated, “Medicare is ready to implement pay for performance as a national program, and differentiating among providers based on quality is an important first step toward purchasing the best care for beneficiaries and assuring the future of the program” (3). In hopes of stimulating quality improvement, several governmental organizations have placed new emphasis on aligning financial incentives with quality through pay for performance (P4P), or value-based purchasing, initiatives.

The impetus for adoption of P4P programs has been the unremitting rise in health care costs, along with growing recognition that the quality of care delivered in the United States falls well short of expectations. Health care expenditures in the United States currently constitute 15% of the gross domestic product and are expected to rise through this decade (4). Federal government concerns over cost can only heighten as the aging of the “baby boomer” generation (people born between 1946 and 1964) swells

the number of Medicare beneficiaries. Employers are struggling to compete in the global marketplace as health care expenses take up an increasing proportion of the costs of doing business. Despite high expenditures, the current health care system not only fails to provide patients with recommended care consistently but often delivers harmful care (5,6).

With its long history of quality assurance and quality improvement initiatives, the ESRD program has served as a model for innovation in the financing and delivery of care. The ESRD Clinical Performance Measures Project, the National Vascular Access Improvement Initiative, and the ESRD Managed Care Demonstration Project have led to the development of metrics for quality and have demonstrated focused improvements in the care of patients with ESRD.

In this report, we describe conceptual issues in the design and implementation of P4P for chronic kidney disease (CKD) and ESRD care. In addition, we consider the implications of recently implemented and proposed payment policy changes on the broader goals of P4P.

## Medicare Modernization Act

Since its adoption in 1973, the Medicare ESRD program has grown from 7000 patients with ESRD needing dialysis treatment to more than 400,000 patients with ESRD, more than 350,000 of whom require dialysis (7). The dialysis market has also evolved with initial growth of independent dialysis facilities and more recent consolidation of the dialysis industry. Now a small number of predominantly for-profit large dialysis organizations control most of the dialysis services market. Despite the growth of the ESRD program and seismic shifts in the dialysis market, methods of payment have been until recently largely unchanged.

*Published online ahead of print. Publication date available at [www.cjasn.org](http://www.cjasn.org).*

**Address correspondence to:** Dr. Amar A. Desai, 117 Encina Commons, Stanford, CA 94305-6019. Phone: 415-336-6873; Fax: 650-723-1919; E-mail: [desai\\_amar@hotmail.com](mailto:desai_amar@hotmail.com)

Since 1983, the Medicare program has reimbursed dialysis providers for a specified bundle of services at a flat fee known as the composite rate. This payment structure for the Medicare is resource based (on a per-service basis), rewarding increased volume even if that service is inefficient or ineffective. Historically, reimbursement policies have not adjusted the level of payment for outcomes, efficiency, or any specific metrics of quality. The Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA) includes provisions designed to change fundamentally the structure of the ESRD financing system. First, it requires a basic case-mix-adjusted prospective payment system for dialysis patients. Second, it mandates the design of a demonstration project for a broader bundled payment system that includes all injectable drugs and laboratory tests.

## Evidence Base for P4P

The evidence base for P4P in medicine is sparse with mixed results (Table 1). Using modest financial incentives in a Medicaid health maintenance organization and low-income urban population, Hillman and colleagues (8–10) demonstrated no effect on cancer screening rates and pediatric preventive care. Other studies have reported modest success with targeted financial incentives. For example, an incentive amounting to \$0.80 to \$1.60 per vaccination led to a 10.3% increase in influenza immunization rates in a Medicare population (11). In another study, performance bonuses ranging from \$5000 to \$10,000 per physician per year led to a 14% increase in documentation of patients' smoking status and a 6% increase in smoking cessation counseling in a health maintenance organization setting (12). Differences in the success of incentives in these studies may be explained by the type of quality measure evaluated, the size of incentives, or characteristics of the study populations (*e.g.*, socioeconomic). More recently, Rosenthal *et al.* (13) evaluated a P4P program initiated by a large health plan and demonstrated that P4P bonus payments representing approximately 5% of the professional capitation paid by the plan and 0.8% of the groups' overall revenue had no effect on improving mammography rates or glycosylated hemoglobin testing and only a modest effect on augmenting cervical cancer screening. These authors concluded that paying physicians to achieve a fixed performance target may produce little incremental benefit in quality and serves only to reward those with higher performance at baseline. Taken together, the considerable heterogeneity in study design, incentive size, and type of performance targets in published studies that have evaluated P4P has significantly limited the generalizability of previously published work.

Despite a paucity of data linking P4P to measured outcomes, the number of P4P programs in the United States has grown dramatically. In 2003, Rosenthal *et al.* (14) identified 31 sponsors of P4P initiatives. Most were directed at hospitals. These authors found that most programs rewarded achievement of an absolute target (*i.e.*, quality assurance) rather than rewarding change directly. More recent estimates suggest that there are more than 100 P4P initiatives in various stages of development.

Although a recent systematic review of the literature noted

some positive effects of financial incentives at the physician level and the provider groups level, the authors cautioned that financial incentives can have unintended negative effects on quality of care (15). P4P programs aimed at family practitioners in Britain's National Health Service showed significant improvement in quality targets, but there was some evidence of gaming the system by excluding certain groups of patients (16). These findings suggest that it will be necessary not only to monitor performance but also to ensure continued access for the most complex, costly patients (17).

## Implementation Challenges

Researchers, policy makers, and health care managers have detailed the considerable challenges in developing P4P programs in health care (18–20). The design and implementation of P4P for the CKD and ESRD populations pose specific opportunities and challenges. Young *et al.* (21) described a useful conceptual framework for the design and implementation of P4P programs organized around five dimensions: (1) Provider awareness of quality incentives, (2) size and structure of incentives, (3) clinical relevance of quality targets, (4) accountability for quality targets, and (5) fairness of pay-for-quality programs. Table 2 examines features of the ESRD program across these dimensions.

Specific features of the ESRD financing and delivery system make it amenable to P4P. The ESRD program has significant experience in quality measurement and improvement programs that have been instrumental in the development of a core set of clinical performance measures that are widely recognized and accepted by the nephrology community. The ESRD program has an established data collection infrastructure, which includes the Standardized Information Management System that links the 18 ESRD Networks with the Centers for Medicare and Medicaid Services (CMS) and the US Renal Data System. In 2003, CMS introduced a new system, VISION, to encourage electronic entry and transmission of facility-level data to the ESRD Network, but overall use of this system has been low. To create a more robust information database, CMS should encourage universal adoption of the VISION data architecture after it has been adequately tested. Facility-level information should be integrated with existing data to create actionable performance reports and provide timely feedback. Some P4P programs have used financial incentives to encourage the adoption of information technology by individual practitioners within their offices. P4P initiatives can provide a unique opportunity to encourage large-scale implementation of information technology in outpatient nephrology practices. Clinical information systems designed for enhanced interoperability can provide much needed data on CKD care and serve as an important link as patients transition to ESRD.

As the major payer for ESRD care, CMS will determine the size and structure of financial incentives. CMS and MedPAC have emphasized budget neutrality and a shared belief that linking quality to payment should not require additional Medicare funding. Budget neutrality implies that instead of putting more money into the system, the ESRD program will shift existing resources. Other P4P experiences suggest that financial

Table 1. Studies examining impact of financial incentives<sup>a</sup>

Study	Year	Setting	Clinical Area	Incentive	Outcome
Hillman <i>et al.</i> (8)	1998	Medicaid managed care organization	Breast, cervical, colorectal screening rates	Quality bonus of 20% of capitation payments for top three performers and 10% of capitation payments for three next high-scoring practices	Screening rates doubled overall (from 24 to 50%), with no significant differences between intervention and control group sites
Hillman <i>et al.</i> (9)	1999	Medicaid managed care organization	Pediatric preventive care	Quality bonus of 20% of capitation payments for top three performers and 10% of capitation payments for three next high-scoring practices; bonuses ranged from \$772 to 4682 per site	Significant increase in all three study groups throughout the time in total compliance scores (from 56 to 73%), as well as scores for immunizations (from 62 to 79%) and other preventive care (from 54 to 71%); however, no significant differences were observed between either intervention group and the control group
Fairbrother <i>et al.</i> (10)	1999	Medicaid program, New York City	Pediatric immunization rates	Performance bonus: \$1000 and \$2500 bonus for 20 or 40% improvement and \$5000 bonus for reaching 80% coverage regardless of baseline performance	The percentage of children who were up-to-date for diphtheria-tetanus-pertussis and <i>Haemophilus influenzae</i> type b, polio, and measles-mumps-rubella immunization in the study's performance bonus group improved by 25.3 percentage points ( $P < 0.01$ ) but not in the enhanced fees group
Kouides <i>et al.</i> (11)	1998	Medicare Demonstration project	Influenza immunization rates in elderly	Enhanced fees: \$5 for each vaccine administered within 30 d of its coming due and \$15 for visits in which multiple vaccines are administered Reimbursement bonus of \$0.80 and \$1.60 (above standard \$8 fee) per immunization if the practice's overall immunization rate was 70 or 85%, respectively	For practices in the incentive group, the mean immunization rate was 68.6% (SD 16.6%) compared with 62.7% (SD 18.0%) in the control group practices ( $P = 0.22$ ); the median practice-specific improvement in immunization rate was 10.3% in the incentive group compared with 3.5% in the control group ( $P = 0.03$ )
Roski <i>et al.</i> (12)	2003	Large multispecialty group	Smoking cessation	\$5000 to \$10,000 bonus based on documenting smoking status of 75% of patients and advice to quit smoking at last visit for 65% of current smokers	Patients' tobacco use status was statistically significantly ( $P < 0.01$ ) more frequently identified in clinics with the opportunity for incentives and access to a registry than in clinics in the control condition; patients who visited registry clinics accessed counseling programs statistically significantly more often ( $P < 0.001$ ) than patients who received care in the control condition; no impact on smoking cessation rates
Rosenthal <i>et al.</i> (14)	2006	Large private managed care organization	Mammography rates, Papanicolaou smear rates, glycosylated hemoglobin screening	Quarterly bonus of approximately \$0.23 per member per month for each performance target that was met or exceeded; in total, the plan awarded \$3.4 million	Compared with physician groups in the control, the intervention group demonstrated greater quality improvement after the P4P intervention only in cervical cancer screening (a 3.6% difference in improvement; $P = 0.02$ ); for all three measures, physician groups with baseline performance at or above the performance threshold for receipt of a bonus improved the least but garnered the largest share of the bonus payments

<sup>a</sup>P4P, pay-for-performance.

Table 2. Key dimensions of design and implementation of P4P<sup>a</sup>

Dimension	Key Issues	Implications for ESRD
Awareness of quality incentives	Provider familiarity Communication strategy	Nephrologists have considerable experience with proposed clinical performance measures.
Size and structure of financial incentives	Dollar amount for incentives Bonus <i>versus</i> fee schedule <i>versus</i> withhold	Budget neutrality requirement will result in redistribution of existing resources with winners and losers. Renal Physician's Association has lobbied strongly against withhold arrangement.
Clinical relevance of quality targets	Linking structural and process measures to outcomes Measurement reliability and data integrity Timely feedback	Facility-level mortality continues to vary significantly despite improvements in dialysis adequacy and anemia process measures. Current data collection systems may not be able to provide real-time feedback on performance.
Accountability for quality targets	Matching accountability with control Patient compliance issues	Many areas of ESRD care are multidisciplinary in nature; it is difficult to assign accountability ( <i>e.g.</i> , failed vascular access). Some performance measures depend on adherence to medications and dietary recommendations ( <i>e.g.</i> , phosphate binders).
Fairness of pay for performance programs	Definition of quality target: Threshold value <i>versus</i> percentage improvement Case-mix adjustment	Proposed ESRD bundled payment will consider both meeting absolute targets and improvement over time. Unclear whether current case-mix adjustment based only on age and body mass index adequately identifies patients who are sicker.

<sup>a</sup>Adapted from reference (21).

incentives must affect a large enough share of physician income to produce meaningful change. The current reimbursement structure and payer mix gives CMS leverage to implement P4P incentives and effect change among ESRD providers. In addition, private insurers, who have growing numbers of patients with ESRD and are carrying an increasing financial burden of ESRD care, are also likely to develop CKD- and ESRD-specific P4P programs.

Financial incentives can be directed at either the individual nephrologist or physician group or at the level of the dialysis facility. Currently, much of nephrology practice occurs within medical groups rather than solo practices. Multiple nephrologists may be involved in the care of any patient. Furthermore, nonphysician care providers (*e.g.*, nurse practitioners, physician assistants) are increasingly used in the care of dialysis patients and may see patients as often as the primary nephrologists. Dialysis facilities have nurses, technicians, dieticians, social workers, and physicians who play important roles in patient care. In addition, dialysis patients typically have multiple co-

morbid conditions for which they are seen by other providers, including cardiologists, endocrinologists, vascular surgeons, and interventional radiologists.

Incentives that target individual providers promote meeting performance targets, but they fail to account for the multidisciplinary nature of nephrology care. Pham *et al.* (22) described the care patterns of 1.79 million Medicare beneficiaries and found that care is highly dispersed among many physicians. The average patient sees two primary care physicians and five specialists, working in a median of four practices, during the course of a year. For patients with chronic conditions, care dispersion was even more pronounced with greater number of physicians and practices involved in each patient's care. Payment systems that assign accountability for care across various settings and extended periods of time will be best suited to promote care coordination, efficiency, and achievement of clinical performance goals (23).

Incentives at the dialysis facility level or at the organizational level may be better able to stimulate structural changes in the



care delivery process (e.g., implementation of information technology). In addition, it will be difficult to evaluate and perform adequate case-mix adjustment for individual physicians who take care of a small number of dialysis patients. Physician groups and dialysis facilities are more likely to have enough patients to produce statistically meaningful results.

Linking payment to quality within a single setting does not necessarily enhance coordination across settings. Alignment of incentives for dialysis facilities, nephrologists, and other practitioners can stimulate much needed collaboration and coordination among care providers. Incentive systems that are perceived to be unfair—paying too much for some patients, paying too little for others, or penalizing providers for the poor care of others—may result in “cherry picking” behavior by providers and facilities. Efforts to recruit patients with favorable risk profiles may have the deleterious effect of limiting access of the most vulnerable patient groups.

## Recent Policy Changes

Recent developments in the financing of ESRD care parallel the broader emphasis on payment for quality. Incentives created by reimbursement policy changes are sometimes difficult to anticipate and may affect the quality of care delivered to patients. In this section, we detail three recent changes in ESRD payment policy that are either fully implemented or in development. Although none of these policies reflects P4P in the traditional sense, they provide insight into how economic incentives might affect provider behavior, and lessons learned from their implementation may influence the design of future P4P programs for ESRD.

### *Increasing Physician Contact*

In January 2004, Medicare revised its payment rules with a system that uses temporary “G” codes to establish different payments for physician services. The monthly capitation payment was revised to account for the number of provider-dialysis patient interactions per month. When physicians are reimbursed on a capitated basis, there is less financial incentive to spend time with patients than under fee-for-service. The goal of shifting from a capitated to a fee-for-service payment based on visit frequency was to encourage more frequent visits among dialysis patients and their nephrologists. This goal was motivated by previous work suggesting that dialysis-related outcomes are improved by more frequent physician contact (24). An analysis of the 5-yr survival of 4661 patients with ESRD by Held *et al.* (24) showed that mortality was directly correlated with physician staffing. An analysis of the Dialysis Outcomes and Practice Patterns Study (DOPPS) data also suggested that mortality risk was slightly lower at dialysis facilities where physicians saw patients more frequently (25). In addition, professional societies such as the Renal Physicians Association and the American Society of Nephrology developed a position paper that recommended weekly nephrologist visits for all patients who have ESRD and are treated with in-center hemodialysis (26).

However, more recently published data suggest that more frequent nephrologist visits are not necessarily associated with

better outcomes. Plantinga *et al.* (27) showed that survival, hospitalization rates, quality of life, and subjective ratings of care were not influenced by the frequency of physician visits on dialysis. After implementation in January 2004 of the new policy to encourage more frequent nephrologist visits, Mentari *et al.* (28) designed a study to determine the influence of this policy change. These authors found that the number of visits per patient-month increased from 1.52 before to 3.14 after ( $P < 0.001$ ) and that the percentage of patients with no nephrologist visits per patient-month decreased from 16.6% before to 4.6% after ( $P < 0.001$ ). However, there were no clinically important changes in  $Kt/V_{urea}$ , serum concentrations of albumin, hemoglobin, phosphorus and calcium, hemodialysis catheter use, ultrafiltration volume, the number of shortened or skipped treatments, hospital admissions, hospitalization days, self-reported health-related quality of life, and patient satisfaction, a diverse collection of factors considered proxies for the quality of hemodialysis care. To the extent that a patient’s dialysis experience might be improved by increased interaction with his or her nephrologist, the move to create a minimum frequency for direct nephrologist–dialysis patient contact was successful. However, so far, the policy has not been shown to have a meaningful effect on objective dimensions of quality and likely resulted in greater expenditures for physician services.

### *Case-Mix Adjustment*

A key provision of the MMA was the development of a case-mix-adjusted prospective payment system for a limited number of patient characteristics that was adjusted by geographic index for dialysis payments. To establish the case-mix rates, the CMS contracted with the Kidney Epidemiology and Cost Center to construct models based on 2000 to 2002 national data for each dialysis provider using facility cost reports and data from the CMS Medical Evidence (2728) form. From this model, CMS adopted a case-mix adjustment based on age and body composition that took effect on April 1, 2005 (29,30).

Under the new case-mix adjustment system, Medicare modifies reimbursement on the basis of patient characteristics. Correction factors increase reimbursement for facilities that care for younger and older individuals and for people of larger body size (measured by body surface) and also adjust for people with a very low body mass index ( $<18.5 \text{ kg/m}^2$ ). Some observers have argued that dialysis facilities, in response to the new case-mix adjustment payment, may alter their patient recruitment strategies and place the most vulnerable populations at risk (31). Furthermore, the proposed risk adjustment identifies patients who are costlier than average to dialyze but not the patients for whom the facilities incur the highest cost. For example, use of cost reports neglects that the costliest patients are those who require prolonged hospitalization, resulting in the assigned chairs’ remaining empty with no payment (32).

A case-mix adjustment that evaluates the intensity of interventions and acuity of patients, conversely, may lead to a more equitable distribution of financial resources for ESRD care (33). For example, a study that used a modified Charlson comorbidity index to predict outcomes and costs in dialysis patients demonstrated an 87% cost differential between providing care

to patients with low *versus* high comorbidity scores (34). The move toward a risk-adjusted composite rate must be accompanied by close evaluation of its effect on patient recruitment, treatment patterns, and quality of care. A well-designed case-mix adjustment can provide a safeguard to ensure that providers do not turn away sicker patients or those who require more complex care. The current system could provide a disincentive to the care of black women (who tend to be lighter in weight than men but unlikely to have a body mass index  $<18.5$  kg/m<sup>2</sup>) and other people of average or smaller body size.

### *ESRD Bundled Payment Demonstration Project*

A second important provision of the MMA was the requirement that the Secretary of Health and Human Services submit a report on the design of a broader bundled payment system that includes injectable drugs, laboratory tests, and other items that currently are excluded from the outpatient bundle. On the basis of this report, there is a plan to start a 3-yr bundling demonstration, which still has not begun. This fee-for-service demonstration will cover most separately billed items and services provided by dialysis facilities (including erythropoiesis-stimulating proteins) and will include a P4P component.

The Advisory Board for the Bundled Payment Demonstration has identified three major components to the project: (1) Definition of the bundle of services for which payment will be made and related consolidated billing rules; (2) a prospective payment system that bundles services, including case-mix adjustment; and (3) an approach to implementing P4P for both the bundled services and, more broadly, the management of ESRD (35).

The proposed bundle will include nearly all services provided by the dialysis facility. These include composite rate services, nearly all drugs administered by the dialysis facility, laboratory tests ordered by practitioners who oversee patient care in the dialysis facility, blood and blood products administered in the dialysis facility, and medical/surgical supply items. Independent dialysis facilities may find bundling less attractive than will facilities that are owned by large for-profit chains that benefit from significant economies of scale in purchasing supplies from vendors and negotiated discounts with pharmaceutical and biotechnology companies. Moreover, these changes in payment rules may provide a disincentive for dialysis facilities to accept patients who are discharged from the hospital and require high-cost, labor-intensive care (*e.g.*, transfusions, treatment of catheter-associated infections with intravenous antibiotics). These disincentives may result in less timely discharge from hospitals, increased hospital stays, and a net increase in expenditures.

The second component, a prospective payment system, will be divided into a composite rate with a basic case-mix adjustment and a separate bundled add-on with a separate case-mix adjustment. The inherent concern for providers with any prospective payment system is the issue of adverse selection. Preliminary reports on the design of the prospective payment system suggest that CMS plans to implement either an outlier policy under which additional payments are made for high-cost patients or a stop-loss arrangement that limits the potential loss for an individual facility (35).

Finally, the P4P component of the demonstration seems to be the least developed. The stated goals of the project are to reward improved quality; to encourage providers to manage anemia more effectively and efficiently; and to align the incentives across facilities, physicians, and other providers. The proposed two-part design would include a "quality corridor" and "shared savings" (35). The quality corridor approach, which is focused on bundled services, withholds a fraction of payment that can later be distributed on the basis of measures of dialysis adequacy and quality of anemia management. Current plans are to use multiple measures with emphasis on both meeting benchmark targets and improvement. The second part is the shared savings approach, which attempts to align incentives and facilitate collaboration among dialysis facilities, nephrologists, and other providers. Using this approach, payment is based on meeting performance measures (not yet defined) but is also contingent on demonstrated savings.

### **Linking CKD to ESRD**

If P4P is to become a major component of the reimbursement structure for kidney disease, then its use cannot be limited to ESRD. The growing burden of CKD represents a major public health concern that requires significant improvement in detection, treatment, and outcome monitoring (36). Policy makers will need to develop financing mechanisms that recognize the importance of advanced-stage CKD care on the future resource use and outcomes of patients with ESRD. Furthermore, the predicted rise in the ESRD population and significant expenditures related to these patients should provide sufficient impetus to use incentives systems to manage and delay progression of CKD.

Despite the availability of process measures and consensus among physicians about which measures to target, there is extensive evidence of suboptimal care for patients with CKD. The deficiencies have been documented across a range of areas, including hypertension management, vascular access placement, transplantation referral, and preventive health services (37–41). A retrospective analysis of the Third National Health and Nutrition Examination Survey (NHANES III) showed that only 27% of patients with CKD had BP of 140/90 (37). Despite clear evidence of the association of higher mortality rates with the use of temporary and tunneled vascular catheter compared with arteriovenous fistulas, few patients are adequately counseled on vein preservation for fistula creation (38,39). Although kidney transplantation is the preferred renal replacement solution because of improved survival, in 2000, only 22% of dialysis patients who were younger than 70 yr were on a kidney transplant list in the United States (40). Although the cost-effectiveness of a variety of screening tools in the ESRD population has been questioned, health maintenance care in the CKD population is also inadequate with 27, 17, and 40% of patients in the United States receiving the recommended frequency of mammography, Papanicolaou smears, and prostate-specific antigen screening respectively (41).

Early referral to a nephrologist has been shown to be associated with lower mortality rates after initiation of dialysis (42–44). Despite this apparent benefit, a significant number of pa-

tients with CKD are referred late to the nephrologist. This has important implications for P4P initiatives because providers will be evaluated and paid on the basis of measures that can be heavily influenced by the actions of previous providers. One potential solution would be to defer the use of a P4P adjustment for a period of time to treat the complications of CKD that may have been suboptimally managed before initiation of dialysis (20).

Current measures used for ESRD may not be adequate to evaluate the quality of care for patients with stages 1 through 4 CKD. Whereas current recommendations for the treatment of patients with ESRD are based on extensive evidence, less is known about the epidemiology of pre-ESRD CKD. Large observational studies, such as the Chronic Renal Insufficiency Cohort (CRIC) Study, aim to examine risk factors for progression of CKD and develop models to identify high-risk subgroups (45). Results from these studies may identify new predictors of disease progression and mortality that will not only inform future intervention trials but also guide the development of process measures that are linked to outcomes. For example, one area of potential interest is cardiovascular disease (CVD). CKD is strongly and independently associated with CVD, even after adjustment for traditional cardiovascular risk factors. The current National Kidney Foundation Kidney Disease Outcomes Quality Initiative (K/DOQI) guidelines note that individuals with CKD are at increased risk for CVD and that they should be considered in the "highest risk group" for evaluation and treatment according to established guidelines (46). Guidelines that lump all patients with significant risk factors into a catch-all high-risk group will not adequately distinguish the true differences that exist within this group. Important opportunities for risk reduction will likely be missed. For example, research may find that a patient with a strong family history for CVD has a very different risk profile than a patient with stage 4 CKD. Identification of specific risk predictors for CKD progression and development of CVD among patients with CKD may lead to targeted diagnostic and therapeutic strategies.

Limited reimbursement for CKD within the current fee structure represents a significant barrier to the organizational change and multidisciplinary collaboration that can lead to improved outcomes. P4P programs that target nephrologists or dialysis facilities and ignore other physicians (*e.g.*, endocrinologists, cardiologists, vascular surgeons) and participating caregivers including nurses, dietitians, social workers, and pharmacists may fail to align incentives adequately across the spectrum of care. Business experts have described this coordinated care model as a care delivery value chain (47). Services are organized around a medical condition and are tightly coordinated "within an integrated structure designed for expertise in the patient's primary condition, rather than an *ad hoc* structure involving uncoordinated specialists" (47).

The care delivery value chain for CKD and ESRD involves different set of activities, but it also recognizes that there are important links between CKD and ESRD, such as the timely placement of vascular access, management of mineral metabolism and anemia, and close monitoring of comorbidities. Dis-

ease management programs, successfully implemented in other disease states, may be well suited to overcome the current fragmentation of care (48). A systematic review that assessed the clinical and economic effects of disease management in patients with chronic diseases found marked improvements in many processes and outcomes of care but no significant reduction in costs (49).

## Conclusion

Previous experiences with changes in reimbursement policy suggest that insufficient funding or poorly designed incentive mechanisms can result in unintended and unwanted consequences. With the recent rise of CMS-funded P4P initiatives and the upcoming bundled payment demonstration, it is essential to use initial experiences with case-mix adjustment of the composite rate and G codes for the monthly capitation payment to understand facility and provider behavior with particular attention to patient selection and treatment practices (50,51).

Dialysis providers face unique challenges as they balance cost and quality of care for a disproportionately sick population amid capitated reimbursement and increased government regulation. Although skepticism and concern that payment cuts will be deeper is understandable, the potential to be rewarded on the basis of performance should be embraced as we strive to provide the highest quality care. Although P4P is in its formative stages, the nephrology community should resist the tendency to accept these changes passively. Patient and provider advocacy groups such as the Renal Physicians Association and Kidney Care Partners have been particularly active in the development of tools to measure performance; these organizations should remain engaged in the implementation of P4P. Having treated patients with CKD and ESRD, nephrologists can use their unique perspective to promote P4P plans that align payment systems across the spectrum of kidney disease. Finally, there is considerable need for progress on a research agenda for studying financial incentives in health care. Compared with other, more fragmented segments of the health care market, dialysis facilities and nephrology practices provide a unique setting for certain types of randomized, controlled trials. They are also excellent settings for observational studies with concurrent control groups. Additional research will be needed to identify additional performance measures that are strongly associated with mortality and to provide ongoing assessment on how payment changes influence provider behavior.

Future P4P initiatives for the ESRD program should use a mix of individual- and group/facility-level incentives that balance the need for clear lines of accountability with the ability to ensure adequate risk sharing and sample sizes for performance measurement. P4P programs should reward both top performers and those who show significant improvement in performance by creating bonus payments for meeting absolute targets as well as incremental improvements. Finally, providers should receive larger payments to care for disadvantaged populations or groups that are more costly to treat. Although adequate case-mix adjustment can also discourage "cherry picking" behavior, it is important that P4P initiatives not further widen the



disparities in health care quality for these vulnerable patient groups.

The effect of reimbursement policy on provider behavior and quality is especially important in the dialysis industry. Reimbursement policies that do not adequately fund the provision of dialysis itself yet fund other therapies that are used in dialysis can have the perverse effects of limiting care for the sickest, most vulnerable patients and promoting overuse of services or drugs for which compensation is higher. Faced with the potential for erosion of the reimbursement rate and an aging dialysis population with multiple comorbidities, dialysis providers face decisions at the intersection of business practice and clinical care. Well-designed payment systems will reward quality while maintaining appropriate accountability and fairness for providers.

## Disclosures

A.A.D. received support from the National Research Service Award from the Agency for Healthcare Research and Quality (AHRQ).

## References

1. Institute of Medicine: *Crossing the Quality Chasm: A New Health System for the 21st Century*, Washington, DC: National Academy Press, 2001
2. Medicare Payment Advisory Commission: *Report to Congress: Variation and Innovation in Medicare*, Washington, DC, MedPAC, June 2003
3. Mark Miller Testimony before Senate Finance Committee, July 27, 2005
4. Heffler S, Smoth S, Keehan S, Borger C, Clemens MK, Truffer C: US health spending projections for 2004–2014. *Health Aff (Millwood)* [Suppl Web Exclusives]: W5–74–W5–85, 2005
5. McGlynn EA, Asch SM, Adams J, Kessy J, Hicks J, DeCristofaro A, Kerr EA: The quality of care delivered to adults in the United States. *N Engl J Med* 348: 2635–2645, 2003
6. Institute of Medicine: *To Err is Human*, Washington, DC, National Academy Press, 2000
7. US Renal Data System: *USRDS 2006 Annual Data Report*, Bethesda, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, 2005
8. Hillman AL, Ripley K, Goldfarb N, Nuamah I, Weiner J, Lusk E: Physician financial incentives and feedback: Failure to increase cancer screening in Medicaid managed care. *Am J Public Health* 88: 1699–1701, 1998
9. Hillman AL, Ripley K, Goldfarb N, Weiner J, Nuamah I, Lusk E: The use of physician financial incentives and feedback to improve pediatric preventive care in Medicaid managed care. *Pediatrics* 105: 931–935, 1999
10. Fairbrother G, Hanson KL, Friedman S, Butts GC: The impact of physician bonuses, enhanced fees, and feedback on childhood immunization coverage rates. *Am J Public Health* 89: 171–175, 1999
11. Kouides RW, Bennett NM, Lewis B, Cappuccio JD, Barker WH, La Force FM: Performance-based physician reimbursement and influenza immunization rates in the elderly. The primary care physicians of Monroe County. *Am J Prev Med* 14: 89–95, 1998
12. Roski J, Jeddell R, An L, Lando H, Hannan P, Hall C, Zhu SH: The impact of financial incentives and a patient registry on preventive care quality: Increasing provider adherence to evidence-based smoking cessation practice guidelines. *Prev Med* 36: 291–299, 2003
13. Rosenthal MB, Fernandopulle R, Song HR, Landon B: Paying for quality: Provider incentives for quality improvement. *Health Aff (Millwood)* 23: 127–141, 2004
14. Rosenthal MB, Frank RG, Li Z, Epstein AM: Early experience with pay-for-performance: From concept to practice. *JAMA* 294: 1788–1793, 2005
15. Petersen LA, LeChauncy DW, Urech T, Daw C, Sookanan S: Does pay-for-performance improve the quality of health care? *Ann Intern Med* 145: 265–272, 2006
16. Doran T, Fullwood C, Gravelle H, Reeves D, Kontopantelis E, Hiroeh U, Roland M: Pay-for-performance programs for family practices in the United Kingdom. *N Engl J Med* 355: 375–384, 2006
17. Epstein AM: Paying for performance in the United States and abroad. *N Engl J Med* 355: 406–408, 2006
18. Epstein AM, Lee TH, Hamel MB: Paying physicians for high-quality care. *N Engl J Med* 350: 406–410, 2004
19. Williams TR: Practical design and implementation considerations in pay-for-performance programs. *Am J Manag Care* 12: 77–80, 2006
20. Himmelfarb J, Pereira BJ, Wesson DE, Smedberg PC, Henrich WL: Payment for quality in end stage renal disease. *J Am Soc Nephrol* 15: 3263–3269, 2004
21. Young GJ, White B, Burgess JF, Berlowitz D, Meterko M, Guldin MR, Bokhour BG: Conceptual issues in the design and implementation of pay-for-quality programs. *Am J Med Qual* 20: 144–150, 2005
22. Pham H, Schrag D, O'Malley AS, Wu B, Bach PB: Care patterns in Medicare and their implications for pay for performance. *N Engl J Med* 356: 1130–1139, 2007
23. Davis K: Paying for care episodes and care coordination. *N Engl J Med* 356: 1166–1168, 2007
24. Held PJ, Pauly MV, Diamon L: Survival analysis of patients undergoing dialysis. *JAMA* 257: 645–650, 1987
25. Pifer TB, Satayathum S, Dykstra DM, Mapes DL, Goodkin DA, Canaud B, and Bommer J, Kurokawa K, Held PJ, Pisoni RL, Wolfe RA, Young EW: Hemodialysis staffing and patient outcomes in the Dialysis Outcomes and Practice Patterns Study (DOPPS) [Abstract]. *J Am Soc Nephrol* 13: 425A, 2002
26. Renal Physician's Association/American Society of Nephrology Position on Minimal Frequency for Direct Nephrologist/ESRD-Dialysis Patient Contact, July 13, 1996. <http://www.renalmd.org>. Accessed December 1, 2007
27. Plantinga LC, Fink NE, Sadler JH, Levey AS, Levin NW, Rubin HR, Coresh J, Klag MJ, Powe NR: Frequency of patient-physician contact and patient outcomes in hemodialysis care. *J Am Soc Nephrol* 15: 210–218, 2004
28. Mentari EK, De Ore PB, O'Connor AS, Love TE, Ricanati ES, Sehgal AR: Changes in Medicare reimbursement and patient-nephrologist visits, quality of care, and health-related quality of life. *Am J Kidney Dis* 46: 621–627, 2005
29. Kidney Epidemiology and Cost Center, University of Michigan: Methodology for Developing a Basic Case-Mix Adjustment for the Medicare ESRD Prospective Payment System, 2005. Available at: [http://www.sph.umich.edu/kecc/pps/CaseMixMethods\\_May19.pdf](http://www.sph.umich.edu/kecc/pps/CaseMixMethods_May19.pdf). Accessed December 15, 2006

30. Hirth RA, Roys EC, Wheeler JR, Messana JM, Turenne MN, Saran R, Pozniak AS, Wolfe RA: Economic impact of case-mix adjusting the dialysis composite rate. *J Am Soc Nephrol* 16: 1172-1176, 2005
31. Nissenson AR: Models of capitated payment for endstage renal disease. *Am J Med* 110: 504-505, 2001
32. Himmelfarb J, Chertow GM: Medicare ESRD prospective payment system: weighing the evidence. *J Am Soc Nephrol* 16: 1614-1615, 2005
33. Chertow GM: Leveling the "paying" field in end-stage renal disease. *Am J Med* 108: 666-667, 2000
34. Beddhu S, Burns FJ, Saul M, Seddon P, Zeidel ML: A simple comorbidity scale predicts clinical outcomes and costs in dialysis patients. *Am J Med* 108: 609-613, 2000
35. Center for Medicare and Medicaid Services, Department of Health and Human Services: Advisory Board on the Demonstration of a Bundled Case-Mix Adjusted Payment System for End Stage Renal Disease (ESRD) Services. Available at: [http://www.cms.hhs.gov/FACA/09\\_AdvisoryBoardontheDemoofPaymentSystemfor\(ESRD\)Services.asp](http://www.cms.hhs.gov/FACA/09_AdvisoryBoardontheDemoofPaymentSystemfor(ESRD)Services.asp). Accessed December 15, 2006
36. Owen WF: Patterns of care for patients with chronic kidney disease: Dying for improvement. *J Am Soc Nephrol* 14[Suppl]: S76-S80, 2003
37. Coresh J, Wei GL, McQuillan G, Brancati FL, Levey AS, Jones C, Klag MJ: Prevalence of high blood pressure and elevated serum creatinine level in the United States: Findings from the Third National Health and Nutrition Examination Survey (1988-1994). *Arch Intern Med* 161: 1207-1216, 2001
38. Xue JL, Dahl D, Ebben JP, Collins AJ: The association of initial hemodialysis access type with mortality outcomes in elderly Medicare ESRD patients. *Am J Kidney Dis* 42: 1013-1019, 2003
39. Woods JD, Turenne MN, Strawderman RL, Young EW, Hirth RA, Port FK, Held PJ: Vascular access survival among incident hemodialysis patients in the United States. *Am J Kidney Dis* 30: 50-57, 1997
40. Epstein AM, Ayanian JZ, Keogh JH, Noonan SJ, Armistead N, Cleary PD, Weissman JS, David-Kasdan JA, Carlson D, Fuller J, Marsh D, Conti RM: Racial disparities in access to renal transplantation: Clinically appropriate or due to underuse or overuse? *N Engl J Med* 344: 1537-1544, 2000
41. Winkelmayer WC, Owen W, Glynn RJ, Levin R, Avorn J: Preventive health measures before and after start of renal replacement therapy. *J Gen Intern Med* 17: 588-595, 2002
42. Avorn J, Bohn RL, Levy E, Levin R, Owen WF, Winkelmayer WC, Glynn R: Nephrologist care and mortality in patients with chronic renal insufficiency. *Arch Intern Med* 162: 2002-2006, 2002
43. Kinchen KS, Sadler S, Fink N, Brokmeyer R, Klag MJ, Levey AS, Powe NR: The timing of specialist evaluation in chronic kidney disease and mortality. *Ann Intern Med* 137: 479-486, 2002
44. Winkelmayer WC, Glynn RJ, Levin R, Owen WF, Avorn J: Determinants of delayed nephrologist referral in patients with chronic kidney disease. *Am J Kidney Dis* 38: 1178-1184, 2001
45. Feldman HI, Appel LJ, Chertow GM, Cifelli D, Cizman B, Daugirdas J, Fink JC, Franklin-Becker ED, Go AS, Hamm LL, He J, Hostetter T, Hsu CY, Jamerson K, Joffe M, Kusek JW, Landis JR, Lash JP, Miller ER, Mohler ER, Muntner P, Ojo AO, Rahman M, Townsend RR, Wright JT; Chronic Renal Insufficiency Cohort (CRIC) Study Investigators: The Chronic Renal Insufficiency Cohort (CRIC) Study: Design and methods. *J Am Soc Nephrol* 14[Suppl]: S148-S153, 2003
46. National Kidney Foundation: K/DOQI Clinical Practice Guidelines for Chronic Kidney Disease: Evaluation, Classification, and Stratification. Available at: [http://www.kidney.org/professionals/kdoqi/guidelines\\_ckd/toc.htm](http://www.kidney.org/professionals/kdoqi/guidelines_ckd/toc.htm). Accessed December 17, 2006
47. Porter M, Teisberg EO: *Redefining Health Care: Creating Value-Based Competition on Results*, Boston, Harvard Business School Press, 2006
48. Chen RA, Scott S, Mattern WD, Mohini R, Nissenson AR: The case for disease management in chronic kidney disease. *Dis Manag* 9: 86-92, 2006
49. Ofman JJ, Bagamgarav E, Henning JM, Knight K, Gano AD, Levan RK, Gur-Arie S, Richards MS, Hasselblad V, Weingarten SR: Does disease management improve clinical and economic outcomes in patients with chronic diseases? A systematic review. *Am J Med* 117: 182-192, 2004
50. Lindenauer PK, Remus D, Roman S: Public reporting and pay for performance in hospital quality improvement. *N Engl J Med* 356: 486-496, 2007
51. Epstein AM: Pay for performance at the tipping point. *N Engl J Med* 356: 515-517, 2007